REMARKS

Claims 11 to 24 are pending in the application.

Information Disclosure Statement

Examiner has requested that applicant resubmit the information disclosure statement submitted 1/19/2011 because the USPTO system was unable to process the statement. Therefore, applicant herewith resubmits the statement of January 19, 2011.

Claim Rejections - 35 U.S.C. 112

Claims 11-12 and 16-17 stand rejected under 35 U.S.C. 112, 2nd paragraph, as being indefinite because it is unclear as to what is being processed during machine-cutting and forming.

Applicant has revised the claim language of claim 11 carefully and it is believed that by separately defining the machine-cutting step and the roll forming step and defining parts being worked on, the claim language is now unambiguous. It is respectfully submitted that the steps relating to machine-cutting (e.g. turning) and roll forming are carried out in the same clamped position in the spindle. This is disclosed e.g. in the specification on page 11, 3rd paragraph. It is further respectfully submitted that the turning and cut-off devices or tools are e.g. schematically shown in the drawings Figs. 1- 4 and also described in connection with these Figures.

It is respectfully submitted that it is clearly set forth in the specification that the machine-cutting steps are an important feature of the present invention as it is the combination of precise roll forming (with axial counterforce) and machining in the same clamping position that enables the desired dimensional precision of the grinding ready product of the process.

Reconsideration and withdrawal of the rejection of the claims under 35 USC 112 are respectfully requested.

Rejection under 35 U.S.C. 103

Claims 11-12 and 17 stand rejected under 35 U.S.C. 103 (a) as being unpatentable over DE 195 26 900 in view of Toth (US T 102,401).

Examiner argues that DE 195 26 900 discloses combining machine-cutting and roll forming except for generating during the roll forming process an axial counterforce relative to the flow direction of the tubular starting material so that a material flow in axial/radial direction is controlled and flowing material is integrated into the profile to be shaped.

Examiner refers to Toth as disclosing the use of an axial counterforce relative to the flow direction by axially arranged counterpressure tool; examiner refers to Figs. 4 and 6 showing the manufacture of the profiled ring with elements 68, 70, 62.

In examiner's opinion, it would have been obvious to modify the process of DE 195 26 900 by generating during roll forming of tubular starting material an axial counterforce as shown in Toth.

Applicant herewith submits the complete disclosure of US T102,401 as examiner has provided only the figures and Abstract.

Claim 11 now defines the following steps:

- clamping in a clamping position on a spindle a tubular starting material having an axial length greater than an axial length of a profiled ring to be manufactured;
- roll forming in said clamping position an end section of the tubular starting material to shape at least one ring profile;
- performing in said clamping position prior to, parallel to, or after the roll forming process machine-cutting on the end section or the at least one ring profile;
- generating during the roll forming process an axial counterforce at an end face of the end section of the tubular starting material relative to a flow direction of the tubular starting material by an axially arranged counterpressure tool so that a material flow in at least one of an axial direction and a radial direction of the tubular starting material is controlled such that flowing material is integrated into the ring profile
- cutting off in said clamping position the at least one ring profile from the tubular starting material as a completely grinding-ready profiled ring.

It is now set forth that with a single clamping action the tubular material that has a length that is greater than the length of the ring to be formed is roll formed as well as

machine-cut and finally separated from the tubular material as a grinding-ready profiled ring.

DE 195 26 900 shows a similar process on tubular material without any axial counterforce being applied at the end face of the end section; material flow in DE 195 26 900 is thus possible uncontrolled in the axial direction.

The reference to Toth discloses in Fig. 4 an apparatus with roll forming rolls 68, 70 and a split arbor 62 comprised of parts 64 and 66 (see Fig. 5). Fig. 6 shows what is called in the Toth specification an intermediate shape 54 that is formed from the tube slug 50 shown in Fig. 5. On page 11, beginning with the 1st full paragraph, it is disclosed that:

> *"The machine in which the intermediate shape 54 is roll-formed includes (Figs. 4-6) a rotatable split mandrel 62 having two mating sections 64 and 66 which when together provide an outwardly presented surface that corresponds to the inwardly presented surface of the intermediate shape 54. However, the two sections 64 and 66 may be withdrawn axially from each other a distance sufficient to enable the tube slug 50 to be inserted between the two sections 64 and 66."*

Page 12, 1st paragraph, of the Toth reference discloses that:

> *"In addition to the mandrel 62, the rolling machine 52 includes a pair of forming rolls 68 and 70 (Figs. 4-6) which as to the mandrel 62 that is between them are located 180° with respect to each other. .... The periphery of each roll 68 and 70 in terms of contour, corresponds to the outside of the intermediate shape 54 (Fig. 6). The machine 52 also includes supporting rolls 72 .... The supporting rolls 72 along with the mandrel 62 are mounted on a floating table which is free to move in the same line of travel as the movable roll 70."*

The transformation of slug 50 to the intermediate shape 54 is disclosed in the paragraph bridging pages 12/13 and the 1st full paragraph of page 13:

> *"To transform the tube slug 50 into the intermediate shape 54, the movable forming roll 70 is retracted from the fixed forming roll 68, and likewise the two supporting rolls 72 are retracted from each other. Also the mandrel sections 64 and 66 are withdrawn axially from each other. The tube slug 50 is placed between the two mandrel sections 64 and 66, which are then urged together to constrain the slug between them (Fig. 5). Next the movable forming roll 70, while rotating, is*

advanced toward the fixed roll 68, which also rotates, and the supporting rolls 72 are likewise advanced toward the tube slug 50. The rotation of the forming rolls 68 and 70 is imparted to the tube slug 50, whereupon the movable roll 70 is urged against the tube slug 50 with a considerable amount of force. In effect, the tube slug 50 is compressed between the peripheral surfaces of the two forming rolls 68 and 70 with sufficient force to deform the slug 50 as it revolves between the rolls 68 and 70. On its outside surface the slug 50 assumes the contour that is on the periphery of the forming rolls 68 and 70 (Fig. 5). The inside surface of the slug 50 also deforms and in so doing assumes the shape on the outside of the mandrel 62.

"During the roll-forming ***the metal of the slug 50 is displaced axially away from the mid portion of the slug 50*** *which is preferable to displacing the metal in the opposite direction. Moreover, the midportion between the ends of the slug is reduced in diameter so as to fill the initial annular space between the midportion and the outside surface of the mandrel 62. ... "*

The reference to Toth therefore clearly teaches that an **axial displacement of the material** takes place; therefore there is no axial counterforce during roll forming that counteracts the axial flow induced by roll forming. Note also that Figs. 5 and 6 of Toth show that the mandrel sections 64, 66 have moved apart from the initial position before roll forming, shown in Fig. 5, to a more spaced-apart position in Fig. 6 (the gap between the parts 64 and 66 is enlarged; the alignment of the outwardly facing flanges of the mandrel sections have moved axially outwardly relative to the boundary lines of the rollers 68 and 70, as is apparent when comparing Figs. 5 and 6).

Toth therefore discloses no axial counterforce; to the contrary, the split mandrel accommodates axial movement of the material away from the midportion in order to produce the desired final shape.

Toth relates to a closed caliber and roll-forming of a **ring that has already been cut from tubular material**.

In the present invention, the roll forming step is carried out on the tubular starting material, i.e., no prior cutting or separating of a ring blank is carried out; the **profiled ring is separated from the tubular starting material after it has been roll-formed** and machine-cut as needed. One **end of the ring to be formed is still attached to the**

tubular starting material throughout the entire processing sequence.

The tubular material remains clamped in the initial clamping position for all processing steps and this further increases the processing precision.

As pointed out in the last response in connection with the *Connell* reference relating also to roll forming of rings, Applicant would like to stress again that in forming technology the law of constant volume rules This means that for axial ring roll forming, as carried out by Toth, the initial ring (slug) 50 that is cut before roll forming in a separate process from a pipe must have precisely the volume of the final ring to be rolled. Only when the ring blank to be roll formed has the precise volume of the final ring shape, is it possible to produce the ring by rolling with the required precision without requiring any further machining steps. When excess material is present, the rolled ring must be post-machined. Even worse, when the volume of the initial ring blank is too small, the shaped ring will have an incomplete shape and therefore it is unusable (scrap - waste of material and processing time).

The arrangement of Toth, as it relates to roll forming of a ring in a closed caliber (ring blank is enclosed radially and axially), cannot be applied to a tubular starting material where an axial counterforce is applied to an end section of the tubular starting material while the section of the tubular material that is to be transformed into the ring is still part of (attached to) the tubular starting material.

The present invention employs an axially arranged counterpressure tool at the end section of the tubular starting material so that a material flow in at least one of an axial direction and a radial direction of the starting material is controlled such that flowing material is integrated into a profile to be shaped on the profiled ring being manufactured. Counterpressure tool 5 of Figs. 6a, 6b, as disclosed in the specification (paragraph bridging pages 7 and 8), applies an axial counterforce and controls the material flow such that axial material flow is hindered and guided in the radial direction.

As set forth in the instant specification (page 4, last paragraph), the counterforce or counterpressure that is applied prevents the previously unhindered axial material flow by applying a defined force. This enables a control of the material flow in optionally axial and/or radial (in the direction toward the outer diameter of the pipe) direction so that the previously encountered problems, for example, in case of synchromesh transmission rings

and selector sleeves, with regard to obtaining the required precision, particularly with regard to symmetry of groove-like profiles, are solved.

Such a restriction of flow by an axial counterforce applied to an end section of the tubular starting material is not suggested by the combined teachings of DE 195 26 900 and Toth.

Reconsideration and withdrawal of the rejection of the claims under 35 USC 103 are respectfully requested.

ALLOWABLE SUBJECT MATTER

Claim 16 is allowable and has been rewritten in independent form.

CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned would appreciate a phone call or **e-mail** from the examiner to discuss appropriate amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on September 22, 2011,

/Gudrun E. Huckett/

Ms. Gudrun E. Huckett, Ph.D.
Patent Agent, Registration No. 35,747
Schubertstr. 15a
42289 Wuppertal
GERMANY
Telephone: +49-202-257-0371
US-Fax: (877) 470-9712
gudrun.draudt@t-online.de

GEH
Encl.: complete description of US T102,401